

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE CLAIMS

Independent claims 1 and 3 have been amended to clarify that the image display device is adapted to be in contact with the face of the user by using elastic members, and to clarify that when the image display device is worn by the user, a portion of optical elements of the image display device is located at a rear side of the user's head by making light beams folded, thereby positioning a gravity center of the image display device to be located in a rearward and downward direction relative to eyeballs of the user when the user is in an upright position. See Figs. 6-11 and the disclosure in the specification at, for example, page 32, line 1 to page 34, line 36.

In addition, claim 3 has been amended to clarify that each rotational movement shaft of the image display device substantially coincides with the gravity center of the image display device. See, for example, Figs. 7 and 8.

Still further, claims 1 and 3 have been amended to avoid using the terms "nearer" and "vicinity" objected to by the Examiner, and claim 14 has been amended to make a minor grammatical improvement.

Yet still further, claim 4 has been canceled, without prejudice, and claim 5 has been amended to depend only from claim 3.

No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered under 37 CFR 1.116 and that the rejection under 35 USC 112, second paragraph, be withdrawn.

THE PRIOR ART REJECTION

Claims 1-6 were rejected under 35 USC 103 as being obvious over USP 5,253,832 ("Bolas et al"); and claims 7-14 were rejected under 35 USC 103 as being obvious over Bolas et al in combination with one or more of USP 4,257,062 ("Meredith"), USP 6,014,261 ("Takahashi"), USP 6,879,443 ("Spitzer et al"), USP 4,268,127 ("Oshima et al") and USP 5,347,644 ("Sedlmayr"). These rejections, however, are respectfully traversed with respect to the claims as amended hereinabove.

Recently, a system called "motion capture" is widely being used. In such a system, a displayed image is changed by sensing a movement of a user's head who wears a head mounted display device, thereby giving the user a more realistic illusion of actually being at the displayed site. Also, for displaying a larger image to give the user a more realistic illusion, a weight

of the head mounted display has to be increased. However, the increased weight is burdensome to the user.

Therefore, according to the claimed present invention, there is provided an image display device which is: (i) supported by a portion other than a user (so as not to burden the user), and (ii) adapted to be in contact with a face of the user by using elastic members (for "motion capture").

More specifically, according to the present invention as recited in each of amended independent claims 1 and 3, the image display device is supported by the portion other than the user, is adapted to be in contact with a face of the user by using elastic members, and is movable in accordance with a movement of the face of the user, wherein when the image display device is worn by the user, a portion of optical elements of the image display device is located at a rear side of the user's head by making light beams folded, thereby positioning a gravity center of the image display device to be located in a rearward and downward direction relative to eyeballs of the user when the user is in an upright position. See Figs. 6-11 and the disclosure in the specification at, for example, page 32, line 1 to page 34, line 36.

With this structure, the display device of the claimed present invention is in contact with the user's face during operation and is moved (efficiently) according to movement of the

user's head. Of course, the user's face (or head) may move horizontally (or laterally) by movement of the hips or legs and the user's face may turn in different (3-D) directions by movement of the neck. Therefore, if the display device is fixed to the user's face and is to be moved by movement of the user's face, the gravity center of the display device must at least be within the shape (or outline) of the user's head. If, however, the gravity center of the display device is outside the shape (or outline) of the user's head, the display device does not move efficiently according to the movement of the user's head, and as a result, the display device shifts from original setting position on the user's head.

In addition, it is respectfully pointed out that merely having the gravity center of the display device within the shape (or outline) of the user's head is not enough either. As shown in attached Reference Fig. 1 (see also Fig. 7A (b) of the present application), since the outline of the head portion located sideward to the eyeball is inclined (indicated by line E), if a gravity center GRA, instead of being located at a position corresponding to the solid black dot, is located at a position corresponding to the cross hatched dot (frontward position relative to eyeball indicated by white dot), when the head is moved in the direction of the arrow D, the gravity center of the display device (located frontward relative to the eyeball) pushes

the head in the direction of the arrow A by counteraction. And since the outline of the head portion is inclined (indicated by line E) a pressing force is spread in the direction of arrow B and arrow C. The pressing force then gets applied in the direction of arrow B along the inclination E, thereby shifting the display device from its original setting position on the head of the user. Therefore, the gravity center of the display device must be located not just within the shape (or outline) of the user's head but it also must be located where the outline of the user's head is not inclined. That is, the gravity center of the display device must be located in a rearward direction relative to the eyeballs of the user when the user is in an upright position. See Fig. 7A and Reference Fig. 1.

Similarly, regarding rotation of the display device, if the center of gravity of the display device does not substantially correspond to the center of rotation of the head, a large amount of force is required for rotation of the display device while wearing it and this force causes shifting of the display device from its original setting position on the user's head. Further, the position of the rotation center of the head can vary within the range of the cross hatched arrow as shown in the attached Reference Fig. 2 according to how the neck is used. As shown in Reference Fig. 2 (which is a front side view of the user's head) the position of the rotation center cannot be in an upward

direction relative to the eyeballs of the user. That is, the head clearly cannot rotate around a center position located above the eyeballs. Therefore, the gravity center of the display device (which must substantially correspond to the center of rotation of the head) must be located in a downward direction relative to the eyeballs of the user when the user is in an upright position. See Fig. 7A.

In order to position the gravity center of the image display device to be located in the rearward and downward direction relative to the eyeballs of the user when the user is in the upright position, according to the present invention as recited in claims 1 and 3, a portion of the optical elements of the image display device is located at the rear side of the user's head by making light beams folded. See for example Fig. 6.

It is respectfully submitted that none of the cited references, either separately or in any combination, achieve or render obvious the above described features and effects of the present invention as recited in amended claims 1 and 3.

Bolas et al discloses a display device wherein the weight of the display device is supported by a supporting mechanism and wherein a user can change a direction of the display device to a desired direction by using both hands to grasp a handle connected to the display device.

It is respectfully pointed out, however, that with the display device of Bolas et al, when the user looks at items in the display of the display device and the user naturally turns his head, the display does not turn unless the hands are used. In addition, it is respectfully pointed out that Bolas et al merely discloses a method and mechanism regarding hanging of the display device, but does not disclose the structure of the display device itself. That is, in Bolas et al, the display device is merely disclosed as a simple box shape. And it is respectfully pointed out that the main body of the display device of Bolas et al is located in front of the users head and it is moved by hand. Therefore, contrary to the display device of the claimed present invention, the gravity center of the display device of Bolas et al is located frontward of the user's head (or eyeballs) and contrary to the claimed present invention, the gravity center of the display device of Bolas et al has no effect on movement of the display device thereof. That is, contrary to the claimed present invention, there is no relationship between the gravity center of the display device and the position of the user's face in Bolas et al.

The other cited references, moreover, have been merely cited with respect to subject matter of the dependent claims, and it is respectfully submitted that the other cited references also fail to disclose or suggest the features of the present invention as

recited in amended claims 1 and 3 whereby the image display device is supported by a portion other than a user, is adapted to be in contact with a face of the user by using elastic members, and is movable in accordance with a movement of the face of the user, wherein when the image display device is worn by the user, a portion of optical elements of the image display device is located at a rear side of the user's head by making light beams folded, thereby positioning a gravity center of the image display device to be located in a rearward and downward direction relative to eyeballs of the user when the user is in an upright position.

Accordingly, it is respectfully submitted that even if all of the cited references were combinable in the manner suggested by the Examiner, any such combination still would not achieve or render obvious the structure of the present invention as recited amended independent claims 1 and 3.

In view of the foregoing, it is respectfully submitted that amended independent claims 1 and 3, and claims 2 and 5-29 depending therefrom, clearly patentably distinguish over the cited references, taken singly or in any combination consistent with the respective fair teachings thereof, under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

Application Serial No. 10/580,123
Amendment under 37 CFR 1.116

Customer No. 01933

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned for prompt action.

Respectfully submitted,

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